

Stormwater Notice of Intent Interactive Map Service

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ABSTRACT. Stormwater management focuses on the control of stormwater runoff generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. Unfiltered stormwater runoff into streams, lakes, ponds, and oceans can have a significant impact on water quality. As stormwater flows over these sites, it picks up pollutants; sediments, nutrients, pathogens, debris, toxins and other various chemicals. Uncontrolled runoff may cause significant adverse impacts to downstream structures and waterways by either increasing the quantity of water being released offsite, impacting downstream water quality through the transportation of common pollutants, or both.

Stormwater control is accomplished through the use of best management practices and the proper implementation of a site specific Stormwater Pollution Prevention Plan. A stormwater pollution prevention plan (SWPPP) outlines how to lawfully discharge nonpoint source pollution. Through the use of proper stormwater management, drainage systems can be designed to address water quantity and quality concerns, alleviating downstream flooding problems and aiding in the restoration of South Carolina's waterways towards supportive conditions conducive to state wildlife and public usage.

The South Carolina Department of Health and Environmental Control (SCDHEC) is the appointed state agency to implement stormwater regulations and provide information on the regulatory side of the process. There are numerous regulations and acts that affect the stormwater permitting programs, ranging from local ordinances to federal acts. Some sites are able to obtain coverage under the state general permit, but sites that pose considerable risk to water contamination are required to obtain an individual permit.

The Stormwater Program requires all construction sites of one acre or more, all regulated Municipal Separate Storm Sewer Systems (MS4s) and industrial sites to obtain stormwater permit coverage.

Construction site stormwater discharges are expected to contain pollutants that contribute to the following water impairments: increases in turbidity, total

phosphorus and total nitrogen, and a decrease in sensitivity of the macroinvertebrate community structure. Any construction site, where the nearest downstream monitoring station has any of the four above impairments, has to adhere to the state sedimentology requirements of a removal efficiency of 80 percent for suspended solids.

MS4s are systems of conveyances that include, but are not limited to, catch basins, curbs, gutters, ditches, man-made channels, pipes, tunnels, and/or storm drains that discharge into state waters. For these conveyances or system of conveyances to be recognized as an MS4, a state, city, town, village, or other public entity must own them.

South Carolina has one large MS4 – the South Carolina Department of Transportation and four medium MS4s – City of Columbia, Greenville County, Lexington County, and Richland County. These MS4s receive individual national pollution discharge elimination system (NPDES) permits for their discharges. In addition, there are over 70 regulated small MS4s. The operators of these may choose to receive coverage under a general permit or obtain individual permit coverage. MS4 entities adhere to all state construction stormwater requirements in addition to local ordinances.

Industrial stormwater discharges are required to be covered under a NPDES permit. The Phase I stormwater regulations created eleven categories of stormwater discharges. The Department may also designate other facilities as requiring a permit, particularly where there is a potential for storm water contamination.

In 2011, the NPDES reissuance basis and procedures for stormwater discharges were modified to include a significant increase in monitoring, assessing and reporting. Submission of a notice of intent (NOI) for stormwater discharges now requires information on the classification of receiving waters, the location of water quality monitoring stations impacted by dischargers and the conditions of assessed stations, including impairments and Total Maximum Daily Load (TMDL) status.

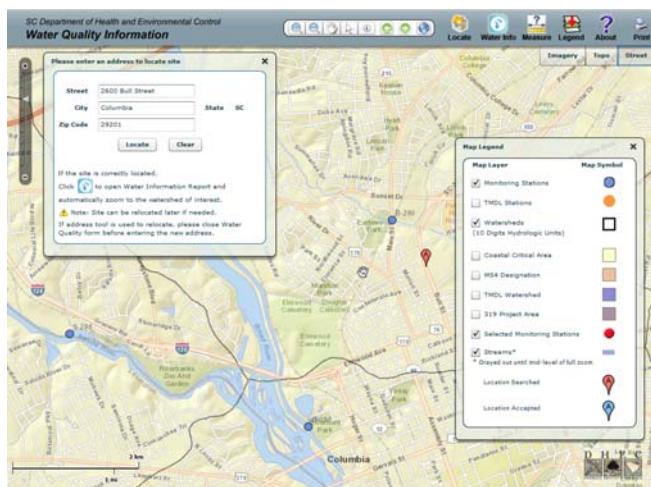


Figure 1. Stormwater NOI Service – Geocoding and Legend

Assembling all the information necessary for permit compliance can be resource intensive. To assist in the process, DHEC developed a web application to help operators, subject to the NPDES stormwater program, in identifying water quality information necessary to comply with their permit. The tool assists in documenting the classification of receiving waters, location of water quality monitoring stations affected by the facility's stormwater discharges, and status of assessed water quality monitoring stations, including impairment and TMDL status.

Geographic Information Systems (GIS) has become an integral tool in environmental decision making within SCDHEC. The agency uses ESRI¹ ArcGIS10 desktop and server products for performing spatial analysis, managing spatial data, creating maps and disseminating the geographic information via web services.

The Stormwater NOI mapping service was created using the ArcGIS API for Flex. Flex was chosen because it gives the user rich interactivity and has a robust development environment.

The data layers used in the application were acquired from a number of sources. Monitoring stations, TMDL stations and TMDL watersheds were digitized/delineated utilizing 1:24,000 USGS topographic imagery. Ten digit watersheds were aggregated from the National Watershed Boundary Dataset² (12 digit units). The 1:24,000 National Hydrography Dataset³ (NHD) was used in stream representation. For querying stream names, a geocoding service against the stream layer was developed to expedite processing time. The MS4 layer was an overlay of city/county jurisdictional boundaries with the 2010 Census Bureau Urbanized Area⁴.

Initiation of the application prompts the user to enter an address (Fig. 1). After locating the site, the map extent zooms to the watershed of interest and the user clicks on the *Water Information* icon to open a form.

Figure 2. Stormwater NOI Service – Forms

The form has five tabs including; application information and permit type, watershed and waterbody information, water quality information and impairment status, approved TMDL stations and watersheds, and report generation (Fig. 2). Included in the report is a summation of the parameters the permittee is responsible for monitoring. The report can be saved as a formatted PDF and attached to the NOI for submission (Fig. 3).

Figure 3. Stormwater NOI Service – Report Generation

Instructions on how to use the map service are provided within the application and can be viewed at www.scdhec.gov/stormwater. At the website, permit guidance and contacts are also available. It is important to note, the tool should not be used as sole source for permit compliance, but in concert with the applicable permit to determine requirements for best management practices, monitoring, etc., found in the NPDES stormwater permit.

The tool has proved be very useful with over 3000 reports generated within the first week of deployment, and over 17,000 NOIs within the year.

Overall, GIS and the services developed increase productivity and lead to greater efficiency and accuracy, both for internal and external users. It is easy to query and analyze large datasets and display only relevant information. Since GIS has become an integral part of DHEC's daily operations, it is possible to make informed decisions and provide better services for the public.

LITERATURE CITED

¹ ESRI 2011. ArcGIS Desktop: Release 10. Redlands, CA: Environmental Systems Research Institute.

² United States Geological Survey. Watershed Boundary Dataset (WBD) . For more information:
<http://nhd.usgs.gov/data.html>

³ United States Geological Survey. National Hydrography Dataset (High Resolution NHD). For more information:
<http://nhd.usgs.gov/data.html>

⁴ Bureau of the Census. 2010 Census. Urban and Rural Classifications. For more information:
<http://www.census.gov/geo/www/ua/2010urbanruralclass.html>